Models of Hurricane Evacuation Behavior

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Hurricanes represent the greatest natural disaster hazard to Florida. In a typical year one hurricane will cross the Florida coast. Because hurricanes have not been as frequent in recent years and Florida's population is rapidly growing, especially in vulnerable coastal areas, most Floridians have never experienced a true hurricane. Moreover, this growth has led to the development of major metropolitan areas in coastal zones (e.g., Southeast Florida, Southwest Florida and the Tampa Bay area). If emergency management personnel are to be able to successfully plan for the hurricane that will eventually strike, they need to know how people will probably react in hurricane emergencies.

The response to hurricanes requires the evacuation of large numbers of people from broad geographical regions in a relatively short amount of time. This presents unique problems not encountered in other types of disasters which are usually confined to small geographical areas. Studies have been done of actual evacuation behavior (e.g., Hazards Management Group, 1986, 1989; Wilkinson & Ross, 1970), but these studies tend to focus on rural areas, have sample sizes too small to make within study comparisons, and use different sampling techniques which precludes between-study comparisons.

Since evacuation behavior is a complex behavior, many variables may affect whether a person evacuates or not. For example, Hazards Management Group (1989) proposed a model in which seven variables are hypothesized to influence evacuation. Unfortunately, no statistical assessment of their model was provided so its validity cannot be ascertained. Carter, Kendall

& Clark (1983) developed a two-stage model examining variables affecting both the consideration of evacuation and actual evacuation behavior. Official statements (watch, warning, evacuation recommendation), unofficial information (advice on how to prepare for hurricanes), risk perception (prior flooding and flooding likelihood), and social contacts (discussions of previous hurricanes, whether friends or relatives checked on their safety) were all predictors of evacuation consideration as shown in a multiple regression analysis. In addition to considering evacuation, additional information (where to go and evacuation routes) and confirmation (direct notification by authorities and discussion of evacuation plans with relatives or neighbors) were significant predictors of actual evacuation. However, no models have been developed using the demographic characteristics of respondents to predict evacuation behavior.

The recently conducted study by Nelson, Kurtz, Gulitz, Hacker, Lee & Craiger (1988) of evacuation behavior during Hurricane Elena in the Tampa Bay Region provided a data base that is large enough both to allow the conducting of internal analyses and to develop and statistically evaluate models of evacuation behavior. In addition, the samples were selected using evacuation zones as the sampling frame. Previous studies (e.g., Baker, 1987) have used cities as the unit of analyses making it difficult to determine if people were actually ordered to evacuate or not.

The Nelson et al. (1988) sample consisted of 2,820 respondents of whom 1,802 lived in hurricane evacuation Zones A, B or C. Of the total sample, 765 respondents evacuated. Thus, the sample was large enough to allow for internal cross-tabulation analyses as well as to develop and test models of evacuation behavior. For example, Nelson et al. (1988) were able to examine the behavior of mobile home dwellers because 200 such respondents were included in their sample. This particular group that had not been previously studied. Since respondents were coded by hurricane zone, it was possible to determine whether they were ordered to evacuate or not.

The major goal of this project was to develop and evaluate a variety of models of the factors influencing the decision to evacuate or not and the factors influencing choice of refuge. To strengthen the model development effort, additional data on income, barrier island residence, and age were collected. Finally, additional frequency and cross-tabulation analyses of the present data base, as supplemented by the additional data, were conducted.

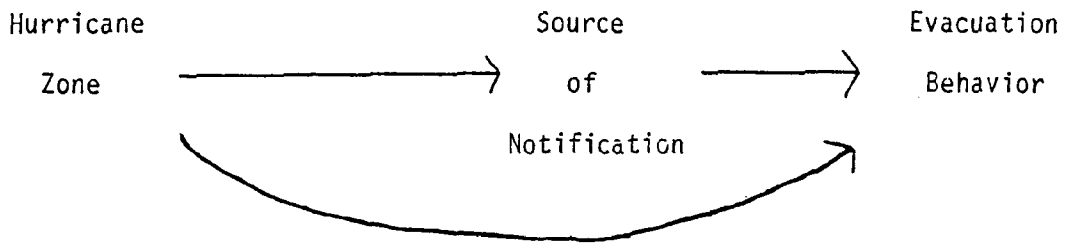
Model Building

The modeling of human behavior through statistical techniques has occurred for several decades. Traditionally, these models of behavior have been simplistic, focusing on the relationship between as few as two variables (e.g., the degree of relationship between a person's age and evacuation behavior during a hurricane). If the relationship was high and positively correlated, older individuals evacuated with higher frequency

than did younger individuals. Conversely, if the relationship was high and negatively correlated, older individuals evacuated less frequently than did younger individuals. However, if there was no relationship between age and evacuation, then individuals at all ages evacuated with the same frequency. Furthermore, if the relationship between age and evacuation during Hurricane Elena was high and positively correlated, this knowledge would then allow us to predict that during future hurricanes older individuals would be more likely to evacuate than younger individuals. Thus, knowledge of the correlation between variables is useful for both describing past behavior and predicting future behavior.

Recent advances in statistical knowledge has taken us well beyond the two variable situation. For example, covariance structure modeling permits examination of the relationship between sets of variables which is important for three reasons. First, the observed correlation between two variables (e.g., age, evacuation behavior) may change when controlled for by other variables (e.g., health, home on a barrier island). Second, full models of behavior can be developed. As depicted in Figure 1, prediction of evacuation behavior is composed of the relationship among several variables. For example, the hurricane zone an individual lives in has a direct influence on the source of the evacuation information (e.g., police media). Furthermore, the model specifies hurricane zone as having an indirect effect on evacuation behavior mediated by the source of notification as well as having a direct unmediated effect. The ability to

Figure 1. Simple model of evacuation behavior.



include additional variables and their relationships into models increases our ability to explain and understand complex issues such as evacuation behavior. Third, different models may be required to describe the evacuation behavior of different groups of individuals (e.g., living in a mobile home versus living in other types of structures). Finally, models of evacuation behavior can be statistically evaluated. It can be determined, therefore, if the variables believed to explain evacuation behavior during Hurricane Elena described statistically what actually occurred. Covariance structure models have been useful in examining many substantive areas in a variety of disciplines. The models have been used in the study of such areas as: racial discrimination in employment, macroeconomic policy formation, and the antecedents and consequences of drug use. A covariance structure model is used to specify the phenomenon under study in terms of cause and effect variables and their indicators. Because the equations in the model represent theoretically significant causal links as opposed to a mere empirical association, the structural parameters do not necessarily correspond with coefficients of regressions among observed variables. As such, the application of structural equation models require statistical tools which are based upon, yet supersede, conventional analysis of variance and regression analysis (Joreskog & Sorbom, 1987).

Implementation of covariance structure modeling through LISREL (Joreskog & Sorbom, 1987) consists of the measurement model and the structural equation model. The measurement model

specifies how the latent variables are reflected in terms of the observed variables and is used to access the validities and reliabilities of the observed variables. The structural model is used to represent the directional influences among latent variables and to account for the amount of explained variance. This implementation of covariance structure modeling is, therefore, very general and allows for the specification of many useful models. These models include, but are not limited to: exploratory and confirmatory factor analysis models, path analysis models, time series econometric models, recursive and non-recursive models for cross-sectional and longitudinal data, and covariance structure models (Joreskog & Sorbom, 1987).

Covariance structure modeling allows a statistical assessment to be made of a hypothesized theoretical model. As such, models must be carefully constructed from theoretical relationships. The technique is very powerful in that it allows the assessment of the overall fit of the model to the data as well as statistical tests of significance of the parameters (e.g., a path between two latent variables or a measured variable which serves as an indicator for the latent variable). Overall indicators of fit of the model include chi-square, the Goodness of Fit index (GFI), and Root Mean Square Residual (RMR). Chi-square, GFI, and RMR are indicators of the fit of the model to the data. A correct model will have a non-significant chi-square which indicates the model is a statistically plausible one; it will have a GFI of .9 or higher; and an RMR of .1 or less indicating it is explaining most (90 percent or more) of the

variance on average for each of the parameters of the model. A large sample size is required for stable maximum likelihood (or generalized least square) estimates, but a large sample will almost always guarantee a significant chi-square. Therefore, a model may be statistically not plausible, but may in fact be doing a good job explaining the relationships found in the data. Individual parameters of the model are tested via z-statistics.

Relying on the hurricane evacuation data base obtained by Nelson et al. (1988), the construction of models proceeded as follows. First, it was assumed that hurricane evacuation behavior can be conceptualized as latent variables and that measured variables can reflect and serve as indicators of those latent variables. Determination of the fit of the models to the data was assessed with the chi-square, GFI, and RMR statistics. Individual parameters were assessed with the z-statistic and modification indices.

Additional Data Collection

Although the data base was extensive, two important pieces of data were not collected during the original study. Income is a difficult question to ask in a telephone interview because respondents view it as an invasion of privacy and tend either to not answer the question or terminate the interview. Therefore, no income data was collected. However, Baker (personal communication) has stated that income is a key factor in predicting evacuees' place of refuge with higher income evacuees using public shelters less than lower income evacuees. Thus, income data was needed for model development and testing. The

Hill-Donnelly city directories which contain a five point "relative affluence rating" by block were used as an indicator of income. These ratings are based on 1980 census data, and take into account such factors as household income, value of owner-occupied housing, and household rent.

Second, hurricane zone was used as the sampling frame and each resident's hurricane zone was entered into the data base. A problem with the scheme is that barrier island residents cannot be separated from low-lying mainland areas because in most cases a specific hurricane evacuation zone includes both barrier island and mainland residents. The problems associated with evacuation are different between barrier island and mainland populations. Baker (1987) reported 93% of the beach residents evacuated, a much higher percentage than Nelson et al. (1988) reported for mandatory evacuation areas; therefore, whether or not a person lived on a barrier island was added to the data base. In addition, factors influencing evacuation behavior and refuge may well be different for barrier islands as compared to mainland residents. Obtaining age information was a problem because some individuals refused to answer this question. Age may be an important predictor of evacuation and type of refuge. Therefore, all respondents who failed to give at least the age of one person in the household, were recalled. Rather than asking specific age, respondents were asked to indicate their age by category (e.g., 50-59, 60-69, etc.). Using this method over 80 percent of the people contacted provided their age category.

Additional Data Analyses

Additional frequency and cross-tabulation analyses were conducted for three reasons. First, because there are no models of evacuation behavior, it is necessary to look for variables which differentiate evacuees from nonevacuees. Second, because of the size of the data base and the lack of time and resources during the 1988 study, it was impossible to conduct a number of analyses of importance to emergency management personnel. Third, new data had been added to the data base.

The responses of barrier island and mainland residents were expected to differ, thus these groups were compared. Both of these groups must evacuate in any storm, but it would take longer for barrier island residents to evacuate because they must cross to the mainland on a limited number of bridges. Also, barrier island residents are in greater danger because once the bridges are no longer passable, there is no means of evacuation. It is important for planners to be aware of both the similarities and differences in the behavior of these two groups. For example, if mainland residents tend not to evacuate, special emphasis must be placed on educating these individuals as to their vulnerability. To provide the most information, these two groups were compared on all the variables.

A major educational tool used by the Tampa Bay Regional Planning Council is the tabloid published in area newspapers. Key questions asked were whether people were aware of its existence, and, more importantly, if they used it during Hurricane Elena. If it was extensively used, this would

encourage other regional planning councils in the state to also publish similar tabloids. A major concern of emergency management personnel is the issue of pets and what people do with their animals. In Hillsborough County, as the result of the Elena experience, the Veterinary Association has instituted pet shelters. Even though pets are not allowed in public shelters, 11 percent of the public shelter evacuees took their pets to the shelter and 77 percent left them at home. Planners need to know what the general population did with their pets and approximately how many evacuees owned pets.

A major problem faced by emergency management personnel during the Hurricane Elena emergency was re-entry. People thought they could safely return to their homes before they actually could. This caused severe problems at check-points and hindered the recovery process. A by-county and by-zone analysis was conducted of responses to the question, "On whose authority did you return home and when did you return home?" In addition, how place of refuge influenced the source of authority for re-entry was also examined. If, as we suspect, the media (especially television) plays a crucial role in this process, then county officials and the media could plan on ways to alleviate the problems in the future.

Results

The results of the project are presented in two sections. The various models are described in the first section while the additional cross tabulations are presented in the second section.

Description of the Models of Hurricane Evacuation Behavior

Using the data from Nelson et al. (1988) and the additional data collected (age, income), models of hurricane evacuation behavior were constructed for the following areas: (1) all areas combined, (2) barrier island residents, (3) mainland evacuation Zone A residents, (4) evacuation Zone B residents, (5) evacuation Zone C residents, and (6) people living outside of Zone C.

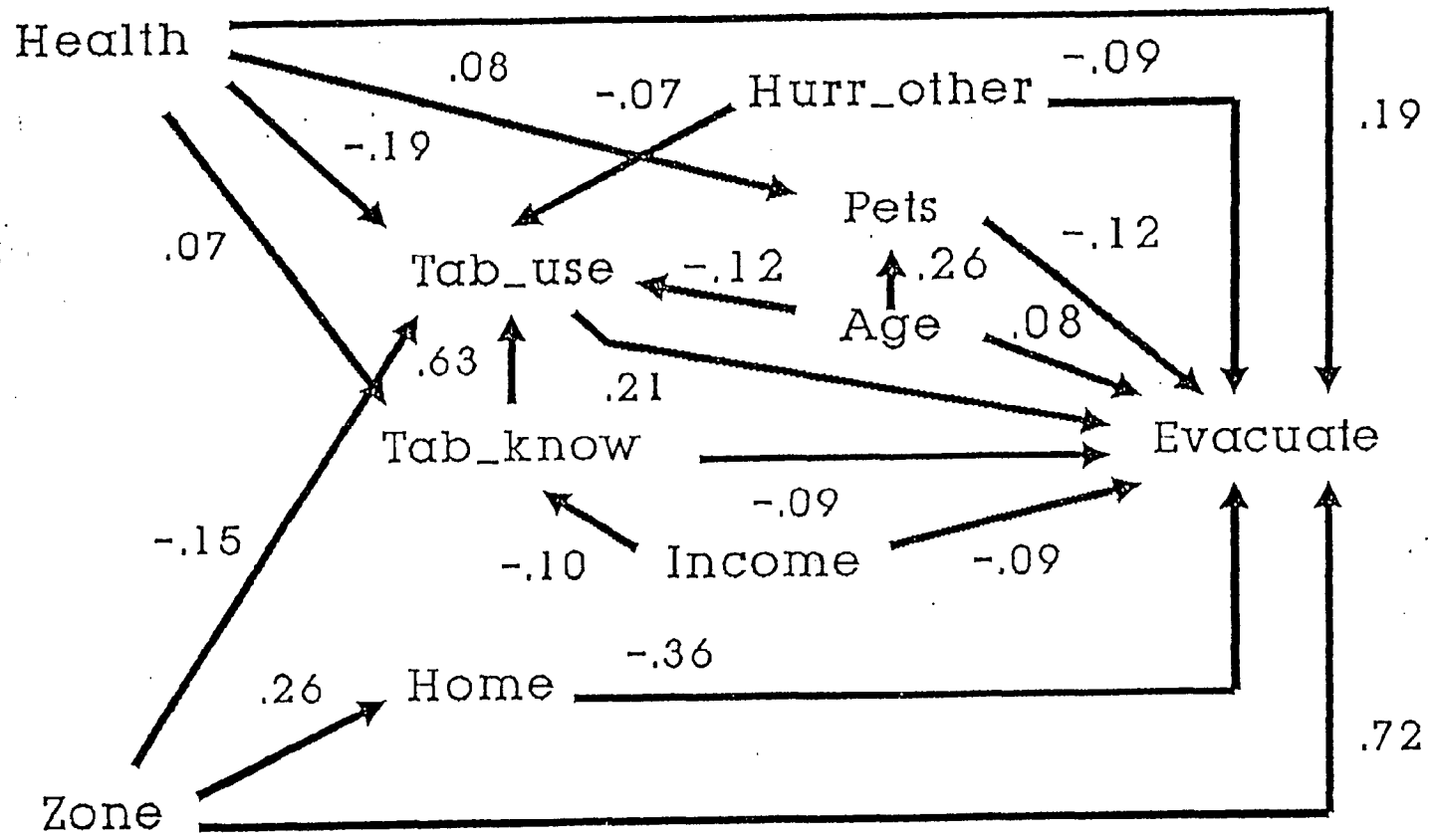
Two different types of variables in a structural model are exogenous variables and endogenous variables. Endogenous variables are influenced by exogenous variables while exogenous variables are not directionally influenced by other variables in the model. The structural model is depicted by the arrows linking exogenous variables to endogenous variables. All else being equal, the larger the number the stronger the relationship between the two variables. In describing each of the models, the model in general will be discussed and then the various relationships within the model will be discussed.

The Hurricane Evacuation Model (Figure 2), which included data from all respondents, shows the complexity of relationships in predicting evacuation behavior. Nine variables independently predict whether or not a person evacuated. The model not only meets the statistical criteria of a good model but many of the relationships make intuitive sense. For example, the most important variables in predicting evacuation were hurricane evacuation zone of the respondent (those in more vulnerable areas were more likely to evacuate) and type of home (the less

Figure 2

Hurricane Evacuation Model

$X^2_{16} = 168.63$, $p < .000$; GFI = .98; RMR = .04



All parameters are significant

the mass of the house the more inclined the residents were to evacuate). People living in mobile homes were more likely to evacuate than residents of multi-story apartment buildings. However, other relationships appeared which have not been previously discussed in the literature. For example, people with pets were less likely to evacuate, while those with health problems were more likely to evacuate. Evacuees were also more likely to use the tabloid than those who stayed at home.

This model contains five exogenous variables: (1) evacuation zone, (2) health problems, (3) income of respondents, (4) age of respondents, and (5) other hurricane experience. The model also contains five endogenous variables: (1) tabloid use, (2) knowledge of tabloid, (3) pets, (4) type of home, and (5) evacuation behavior.

There was a directional relationship between hurricane zone and evacuation behavior in that people living in more vulnerable areas were more likely to evacuate. In addition, hurricane zone indirectly influenced evacuation through two other variables: (1) type of home (there were fewer mobile homes in the more threatened zones), and (2) tabloid use (residents in more threatened zones were less likely to use the tabloid).

Health of the respondents directly affected evacuation behavior because people with health problems were more likely to evacuate. Health also influenced evacuation behavior indirectly through three other variables: pets, knowledge of the tabloid, and use of the tabloid. Residents with health problems were more likely to have pets, were more likely to be aware of the tabloid,

and were less likely to use the tabloid. It should be stressed that just because people were aware of the tabloid did not mean they used it.

Those individuals with higher incomes were more likely to evacuate indicating a directional relationship between these variables. In addition, there was an indirect relationship through knowledge of the tabloid in that those with higher incomes were more likely to be aware of the tabloid.

Finally, older people were less likely to evacuate. (Note that Figure 2 shows a positive relationship but evacuation was coded as 1 and non-evacuation as 2.) Age also influenced evacuation indirectly through pets, (i.e., older people were less likely to have pets). Age also affected evacuation through tabloid use: older people were more likely to use the tabloid. Furthermore, people who stated that they had previously experienced a hurricane were less likely to evacuate. Also, individuals who had previously experienced a hurricane were less likely to use the tabloid.

Tabloid use, an endogenous variable, was directly influenced by age, health, zone, previous hurricane experience, and knowledge of the tabloid. Older people, those without health problems, those who lived in less vulnerable areas, those without hurricane experience, and, of course, those who were aware of the tabloid were more likely to use it. Tabloid use was also indirectly influenced by income through the variable of knowledge of the tabloid. Finally, those individuals who used the tabloid were more likely to evacuate.

Knowledge of the tabloid, another endogenous variable, was directly influenced by income in that higher income residents were more likely to be aware of its existence. People who were aware of the tabloid were less likely to evacuate. Although this may appear contradictory to the above mentioned finding that those who used the tabloid were more likely to evacuate, this is not the case. If people were aware of the tabloid, they could use it or not. Those people that used it were more likely to evacuate. However, those people who were aware of the tabloid, but did not use it, were less likely to evacuate. In addition, people who were unaware of the tabloid could also evacuate. If the proportion of people who were aware of the tabloid did not use it and chose not to evacuate was large, and the proportion of people who were unaware of it and evacuated was also large, then the results obtained make sense.

People who had pets at the time of the hurricane were less likely to evacuate, but the ownership of pets was influenced by both age and health of the respondents. Older people were less likely to have pets, and individuals with health problems were more likely to have them.

The third endogenous variable, type of home, had a direct influence on evacuation in that people living in low mass homes were more likely to evacuate. Type of dwelling was influenced by the evacuation zone of the residence because people living in low mass homes were less likely to live near the coast.

Zone 1: Barrier Island Model

The Zone 1 Model (Figure 3) included all residents of barrier islands. In this model there are only directional influences. Five variables were directly related to evacuation: (1) age, (2) previous experience in a hurricane, (3) knowledge of tabloid, (4) health of respondent, and (5) use of the tabloid. This model can be viewed as a path analysis with each of the variables adding to the predictibility of evacuation. Older people were more likely to evacuate than younger ones. Those respondents who indicated that they had previous experience in a hurricane were less likely to evacuate than those who did not have such previous experience. Individuals with knowledge of the tabloid and those with health problems were both more likely to evacuate. Finally, those individuals who actually used the tabloid were less likely to evacuate than those who did not use the tabloid. At first glance, this finding may appear contradictory to the result that those with knowledge of the tabloid were more likely to evacuate. However, because barrier islands are so vulnerable, it could well be that those who were aware of the tabloid, but did not use it, already knew what to do. On the other hand, those who actually used the tabloid may not have been as knowledgable about evacuation procedures.

Zone 2: Mainland Zone A Model

The Zone 2 Model (Figure 4) refers to mainland residents who lived in hurricane evacuation Zone A, (areas near open water). Statistically, this is an excellent model as the chi-square is not significant, the GFI is well above .9 and the RMR is less

Figure 3

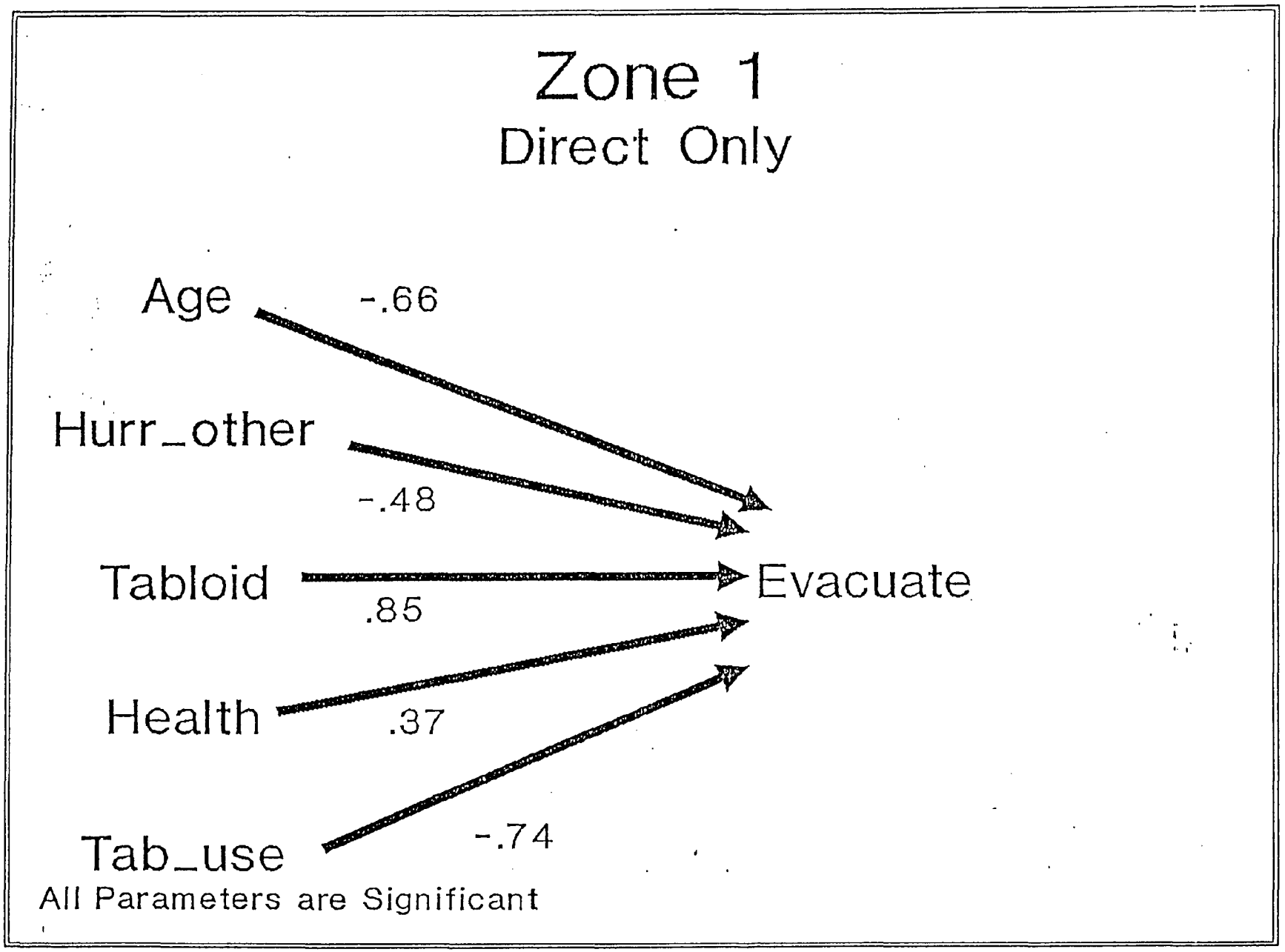
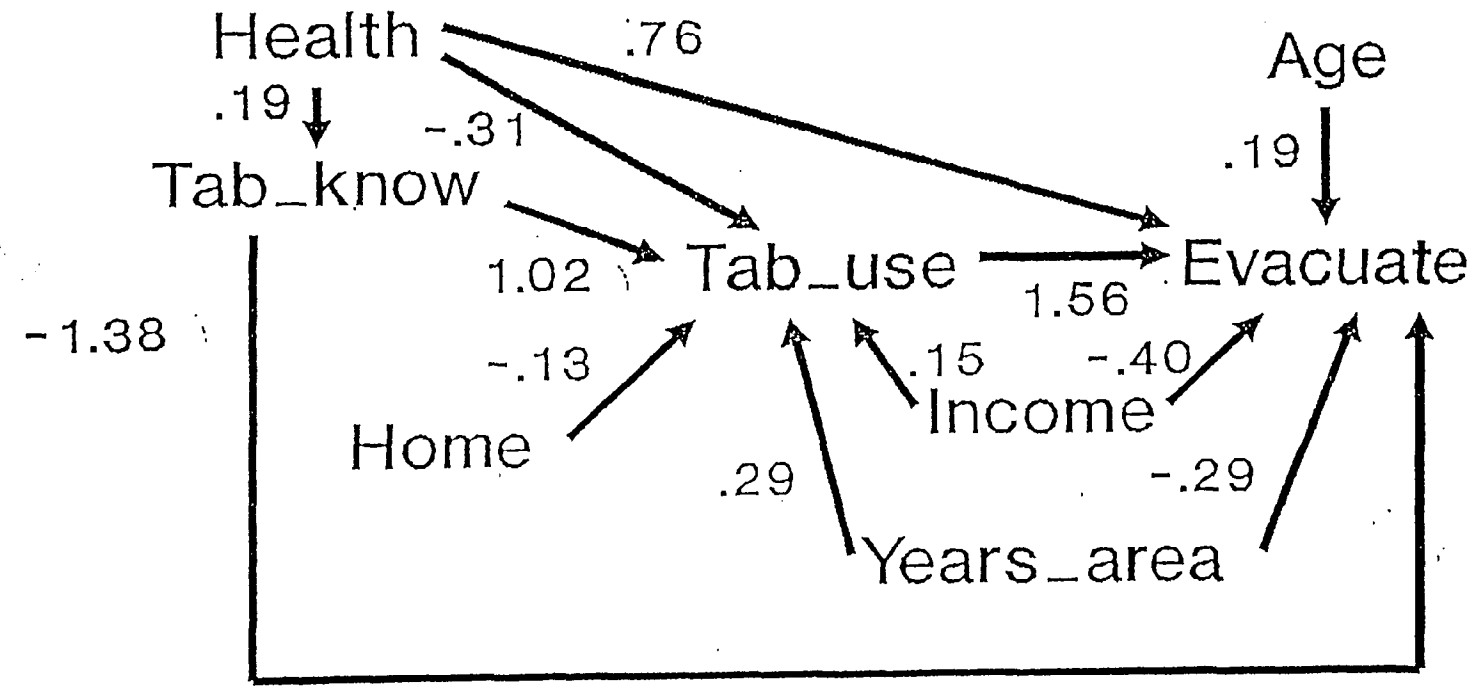

Zone 1
Direct Only
Age
-.66
Hurr_other
-.48
Tabloid
.85
Evacuate
Health
.37
Tab_use
-.74
All Parameters are Significant

Figure 4

Zone 2 Evacuation Model

$X^2_6 = 4.86$, $p < .56$; GFI = .996; RMR = .034



All parameters are significant

than .1. However, certain parameters of this model should be viewed cautiously because three of the values in the model are greater than 1.00. This is a computationally appropriate solution, but interpretation can be difficult.

In this model, six variables were directly related to evacuation behavior, again indicating the complexity in predicting evacuation behavior. An interesting observation is the comparison of the Zone 1 and Zone 2 models. Residents of both areas must evacuate in all storms and both areas are close to the water, yet there are some differences in the variables which predict evacuation behavior. For example, being in a previous hurricane was a predictor in the Zone 1 model but not in the Zone 2 model. Moreover, although age was a predictor in both models, the direction was reversed. In the Zone 1 model older people were more likely to evacuate, but in the Zone 2 model it was the younger people who were more likely to evacuate.

Five exogenous variables were contained in this model: (1) health of the respondent, (2) type of home, (3) years living in the area, (4) income, and (5) age of the respondent. The three endogenous variables were: (1) knowledge of the tabloid, (2) tabloid use, and (3) evacuation behavior.

The health of the respondent directly influenced evacuation behavior because people with health problems were more likely to evacuate. In addition, health influenced both knowledge of the tabloid and its use. People with health problems were more likely to be aware of the tabloid, but were less likely to use it. Of course, this is not surprising because the question of tabloid use concerned using it <u>during</u> the evacuation.

Individuals may have read it well before they evacuated and used the knowledge they gleaned from it when they evacuated.

Type of home was indirectly related to evacuation through tabloid use. People in mobile homes and smaller homes were more likely to use the tabloid than were residents of other types of dwellings.

The number of years respondents had lived in the area was directly related to evacuation behavior. Those residents who had resided in the area longer were more likely to evacuate. In addition, years in the area was indirectly related to evacuation because residents living in the area longer were less likely to use the tabloid.

Income was directly related to evacuation because wealthier residents were more likely to evacuate than less affluent residents. In addition, wealthier people were less likely to use the tabloid. (Note that income was coded on a five-point scale with 5 being the highest income; hence the apparent negative relationship between income and evacuation.) Also, there was a direct relationship between age and evacuation; older people were less likely to evacuate.

Another endogenous variable, use of tabloid, was influenced by four of the exogenous variables and the endogenous variable, knowledge of tabloid. People with health problems, those who lived in the area longer, and those with higher incomes, all used the tabloid less than did their counterparts. At the same time, those respondents with knowledge of the tabloid and those who lived in low mass homes (e.g., mobile homes) were more likely to

use it. Use of the tabloid was directly related to evacuation in that people who used the tabloid were more likely to evacuate.

Finally, the endogenous variable, knowledge of the tabloid, was influenced by the health of respondents because people with health problems were more likely to be aware of the tabloid. People with knowledge of the tabloid were less likely to evacuate.

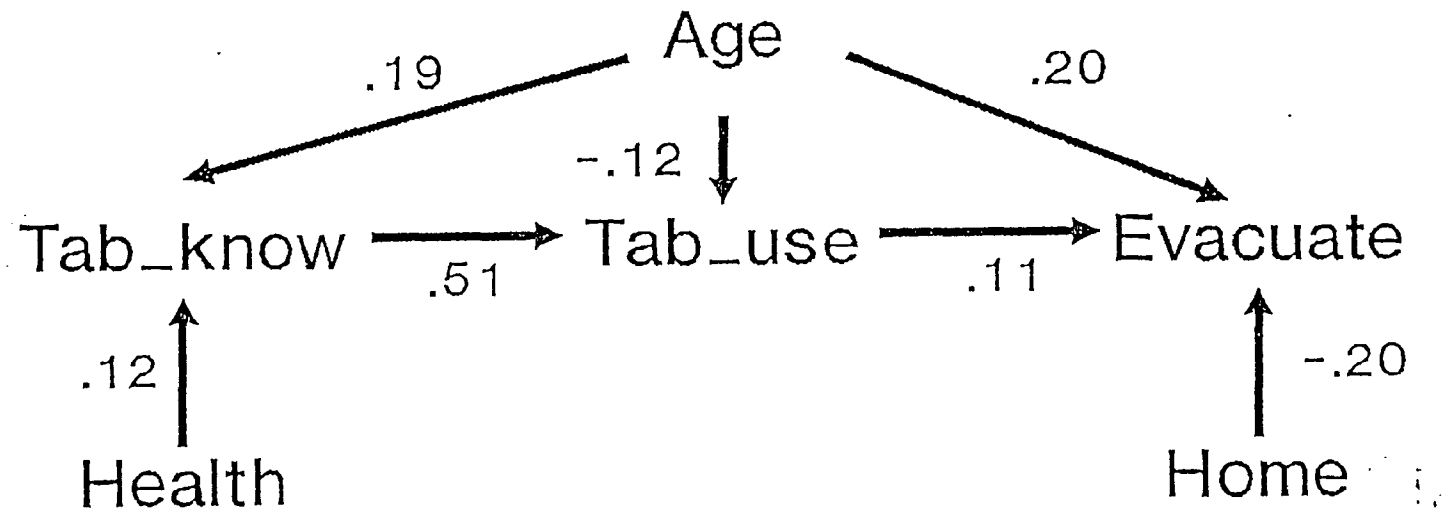
Zone 3: Evacuation Zone B Model

The Zone 3 Evacuation Model (Figure 5) was concerned with residents in Hurricane Evacuation Zone B. Statistically, this is a very satisfactory model as the chi square is not significant, the GFI is greater the .9 and the RMR is less than .1. This model is less complex than the Zone 2 model. Only three variables were directly related to evacuation: (1) age, (2) use of tabloid, and (3) type of home. It is interesting to note that in comparing the models, type of home becomes a more important predictor as the area included in the model is more inland. In addition, the direction of the age variable is the same in both the Zone 2 and Zone 3 models. In the Zone 3 model there were three exogenous variables: (1) age, (2) health of the respondent, and (3) type of residence.

The age of the respondents had a direct effect on evacuation behavior in that older people were less likely to evacuate than younger ones. In addition, this variable had an indirect influence on evacuation through knowledge of the tabloid. In this evacuation zone older people were less likely to be aware of the tabloid.

Zone 3 Evacuation Model

$X^2_5 = 4.08$, $p < .538$; GFI = .995; RMR = .022



All parameters are significant

Figure 5

The health of the respondents had an indirect influence on evacuation behavior through knowledge of the tabloid. People with health problems were more likely to have knowledge of the tabloid than those without health problems. Furthermore, type of residence had a direct effect on evacuation behavior as people in low mass homes were more likely to evacuate.

There were also three endogenous variables in this model: (1) knowledge of the tabloid, (2) use of the tabloid, and (3) evacuation behavior. Knowledge of the tabloid had an indirect influence on evacuation behavior through tabloid use. People with a knowledge of the tabloid were, of course, more likely to use it than those who were unaware of it. Knowledge of the tabloid was influenced by both the age and the state of health of the respondents. Both older residents and those with health problems were more likely to be aware of the tabloid than were their counterparts.

The variables that influenced tabloid use were age, health, and knowledge of the tabloid, but their relationships were complex. Age both directly and indirectly influenced tabloid knowledge. Older people were more likely to use the tabloid and less likely to be aware of it. Basically, this means that although older residents were not as likely to be aware of the tabloid than younger people, those that were aware of it were more apt to use it than were younger residents. The health of the respondents was indirectly related to use of the tabloid through knowledge of the tabloid. Persons with health problems were more likely to be aware of the tabloid. Those people with

knowledge of the tabloid were more likely to use it. Finally, tabloid use was directly related to evacuation because people who used the tabloid were more likely to evacuate than those who did not use it.

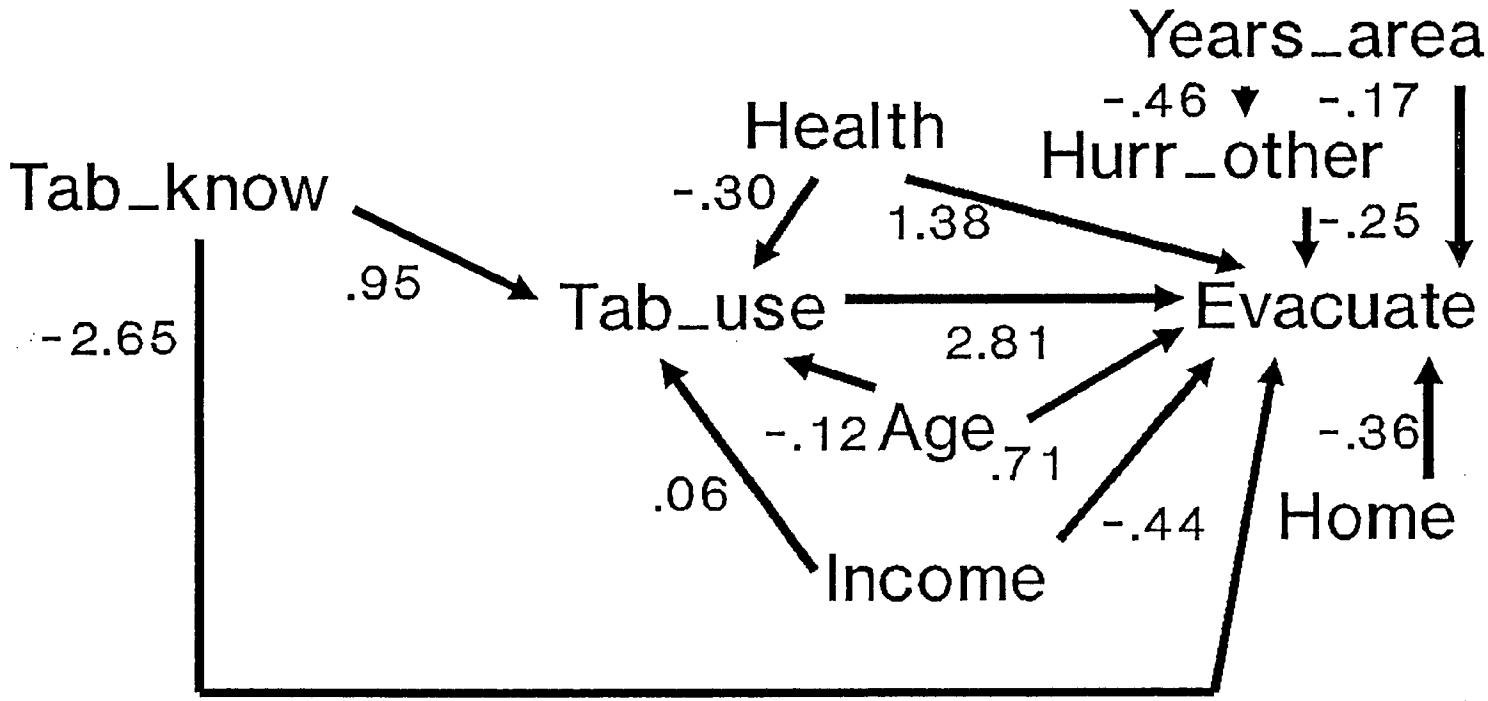
Zone 4: Evacuation Zone C Model

The Zone 4 Evacuation Model (Figure 6) was concerned with residents of the Zone C evacuation area. Individuals living here were not required to evacuate although they lived in areas directly adjacent to mandatory evacuation areas. Statistically, this is a good model because the GFI is well above .9 and the RMR is less than .1. However, as in the case of the Zone 2 Model, two of the parameters have values greater than 1.00. Therefore, these parameters should be viewed cautiously. The model is extremely complex in that eight different variables directly influenced evacuation behavior. The variables of: (1) years in area, (2) other hurricane experience, (3) income, and (4) health were all predictors of evacuation behavior in this model but not in the Zone 3 model. This model contained six exogenous variables: (1) knowledge of the tabloid, (2) income, (3) age, (4) health of the respondents, (5) years living in the area, and (6) type of home.

Knowledge of the tabloid was directly related to evacuation in that people who knew of the tabloid were less likely to evacuate than people who were unaware of its existence. Knowledge of the tabloid was also indirectly related to evacuation through tabloid use. People who were aware of the tabloid were more likely to use it.

Zone 4 Evacuation Model

X^2_8=20.75, p<.008; GFI=.981;RMR=.037



All parameters are significant

Figure 6

Income was directly related to evacuation as higher income people were more likely to evacuate than lower income residents. As mentioned earlier, income was coded on a five-point scale with a 5 being the highest value and evacuation was coded as 1, while non-evacuation was coded as 2; hence, the appearance of a negative relationship. Income was also related to evacuation indirectly through tabloid use as higher income people were less likely to use the tabloid.

Age was directly related to evacation behavior as older residents were less likely to evacuate. In addition, age was indirectly related to evacuation through use of the tabloid. Older respondents were more likely to use the tabloid.

Health was related to evacuation directly. Those individuals with health problems were more likely to evacuate. Health of the respondents was also indirectly related to evacuation through use of the tabloid as people with health problems were less likely to use the tabloid.

There was a direct relationship between years respondents lived in the area and evacuation behavior. People who had lived in the area longer were less likely to evacuate. In addition, years in the area was indirectly related to evacuation behavior through other hurricane experience. Individuals who had lived in the area longer were more likely to indicate that they had previously experienced a hurricane.

Type of dwelling was directly related to evacuation behavior. Residents of low mass homes were more likely to evaucate than were residents of other types of dwellings.

This model also contained three endogenous variables: (1) tabloid use, (2) previous hurricane experience, and (3) evacuation behavior. Tabloid use was influenced by four of the exogenous variables: (1) tabloid knowledge, (2) income, (3) age, and (4) health of the respondent. Those respondents with knowledge of the tabloid and those who were older were more likely to use the tabloid than those with no knowledge of it and those who were younger. On the other hand, individuals with higher incomes and with health problems were less likely to use the tabloid than were their counterparts. Use of the tabloid was directly related to evacuation as those individuals who used the tabloid were more likely to evacuate.

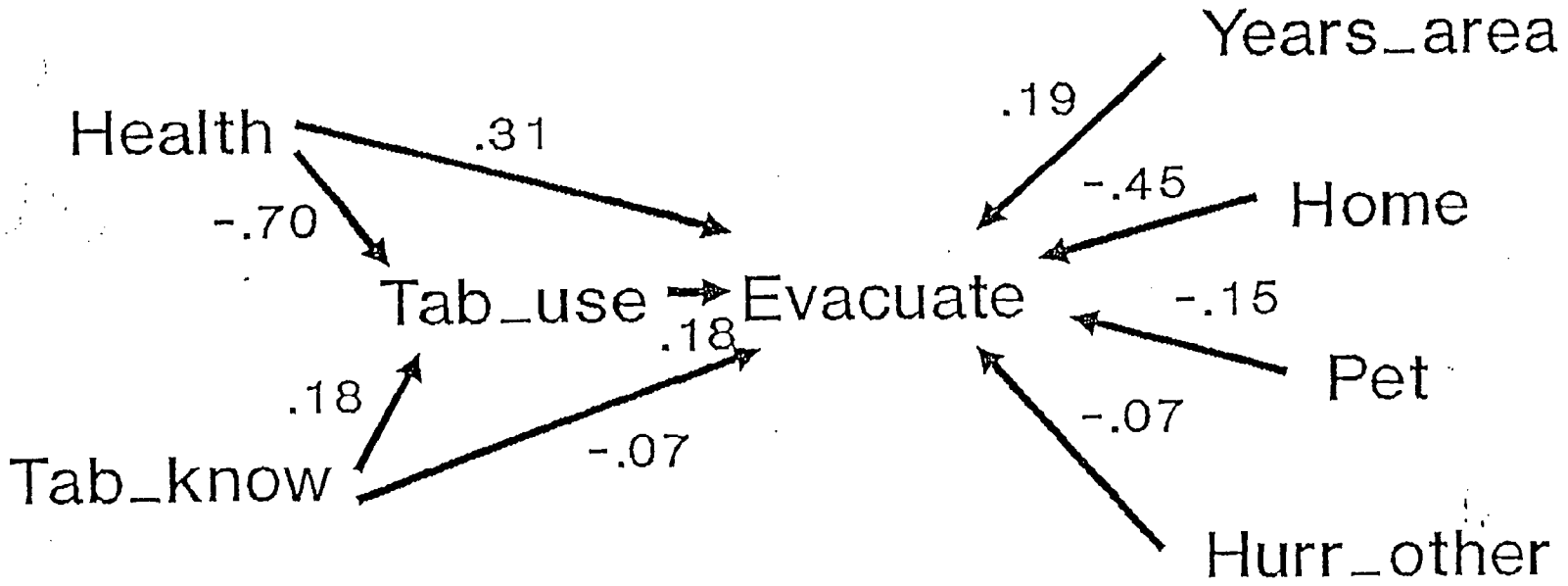
The second endogenous variable, previous hurricane experience, was influenced by years living in the area. Individuals who had lived in the area longer were more likely to have had experienced a hurricane. Hurricane experience was directly related to evacuation behavior, the third endogenous variable, as those residents with previous experience were less likely to evacuate.

Zone 5: Evacuation Outside Zone C Model

The Zone 5 Evacuation Model (Figure 7) was concerned with the behavior of residents who lived outside of Hurricane Evacuation Zones A, B and C. Statistically and practically, this model met all of the criteria for a satisfactory model in that the chi square was not significant, GFI was greater than .9 and the RMR was less than .1. This model was similar to the Zone 4 model. All the variables that had a direct relationship to

Zone 5 Evacuation Model

$X^2_4 = 9.09$, $p < .06$; GFI = .997; RMR = .019



All parameters are significant

Figure 7

evacuation behavior in the Zone 4 model, except age, also had a direct relationship to evacuation in this model. Furthermore, ownership of pets was a predictor here, but not in the other models. People with pets were less likely to evacuate.

Included in this model are six exogenous variables: (1) health of the respondent, (2) knowledge of the tabloid, (3) years living in area, (4) type of home, (5) ownership of a pet, and (6) previous hurricane experience. The health of the respondent directly influenced evacuation behavior because those with health problems were more likely to evacuate. This variable also was indirectly related to evacuation through tabloid use as people with health problems were less likely to use the tabloid.

Knowledge of the tabloid also had both a direct and indirect influence on evacuation. People with knowledge of the tabloid were less likely to evacuate and yet, people with knowledge of the tabloid were more likely to use it.

The other exogenous variables had only a direct influence on evacuation behavior. People who lived in low mass homes were more likely to evacuate while those who had lived in the area longer, had previous hurricane experience, and owned pets were less likely to evacuate.

The only endogenous variable predicting evacuation behavior in this model was tabloid use. This variable was influenced by tabloid knowledge. Obviously, those with knowledge of the tabloid were more likely to use it. In addition, those who reported health problems were less likely to use the tabloid. Finally, tabloid use directly affected evacuation as people who used the tabloid were more likely to evacuate.

Conclusions

Based upon our analyses the following conclusions may be drawn:

(1) Predicting evacuation behavior is a complex process with many variables being related to evacuation behavior.

(2) Different variables are predictors of evacuation behavior as a function of the vulnerability of the area.

(3) Multivariate statistical techniques must be used if the relationships between a variety of demographic variables and evacuation behavior is to be understood.

In summary, this is the first study that has used covariance structure modeling to predict evacuation behavior and only one data base from one hurricane was used. It is, therefore, necessary to cross-validate the models using data from studies of other hurricane evacuations and to conduct extensive surveys of new evacuations as other hurricanes strike the United States.

Additional Data Analyses

Using the additional information which was added to the data base, the following analyses were conducted. All respondents who lived on barrier islands were identified using the addresses on the questionnaires and city maps. Shown in Table 1 are the number of barrier island respondents in each of the counties surveyed. Three items are of special interest in this table. First, there are no barrier islands in Pasco County. Second, Davis Island in Hillsborough County was classified as a

barrier island. Finally, as was the case in Nelson et. al. (1988), Pinellas County was divided into Upper and Lower halves. Also included in Table 1 are the number of respondents in each county who resided in each of the hurricane zones.

Income data by hurricane zone for the total sample was also examined (see Table 2). As was expected, residents of barrier islands tended to be more affluent than any other group. Residents on the mainland who lived in Hurricane Zone A were the next most affluent group. Thus, those who are most threatened by hurricanes, except for mobile home dwellers, appear to be more affluent than the average resident of the area. Tables 3-7 show the income data by hurricane zone for each of the counties. Basically, in all counties the results are similar; those most vulnerable are also more affluent.

In Pasco County over one-half of the data is missing. As yet, there are no census tracts for this area and the available information is questionable because of the rapid growth in this area. Therefore, in all future analyses involving income data, Pasco County was eliminated from the sample. There was missing data from the other counties because these residences were in areas that were developed after the 1980 census. The age grouping distribution for evacuees and non-evacuees by county and hurricane zone of residence is presented in Appendix 1.

Evacuation Behavior by Evacuation Zone of Residence

Evacuation rates for each hurricane zone within each county are presented in Table 8. (Respondents who were either on vacation or not living in the sampled residence at the time of

Table 1.
County of Survey by Zone
(Entries are the Number of Respondents)

	Zone				
County	Barrier Island	Zone A Mainland	Zone B	Zone C	Outside Zone C
Hillsborough	21	76	90	77	167
Manatee	29	33	6	18	58
Upper Pinellas	39	40	53	23	199
Lower Pinellas	92	102	110	70	290
Pasco	0	70	24	36	121
Total	181	321	283	224	835

Table 2.
Income by Zone Total Sample

Income	Zone				
	Barrier Island (n=181)	Zone A Mainland (n=267)	Zone B (n=250)	Zone C (n=224)	Outside Zone C (n=835)
Well Below Average	1.7	14.6	24.4	5.8	21.9
Below Average	6.1	10.3	11.0	20.1	17.6
Average	33.1	21.5	22.6	32.6	15.3
Above Average	32.6	13.7	22.3	24.1	20.8
Well Above Average	22.7	18.1	4.9	0.4	6.2
Missing	0.6	21.8	14.9	16.9	18.0

Table 3.
Income by Zone Hillsborough County

Income	Zone: Barrier Island (n=21)	Zone A Mainland (n=76)	Zone B (n=90)	Zone C (n=77)	Outside Zone C (n=167)
Well Below Average	0.0	7.9	6.7	7.8	23.4
Below Average	4.8	6.6	8.9	9.1	19.8
Average	0.0	38.2	36.7	45.5	15.0
Above Average	95.2	7.9	23.3	28.6	24.0
Well Above Average	0.0	30.3	12.2	1.3	4.8
Missing	0.0	9.2	12.2	7.8	13.2

Table 4.
Income by Zone Manatee County

Income	Zone				
	Barrier Island (n=28)	Zone A Mainland (n=33)	Zone B (n=6)	Zone C (n=18)	Outside Zone C (n=55)
Well Below Average	0.0	3.0	0.0	5.6	13.8
Below Average	13.8	27.3	66.7	27.8	41.4
Average	44.8	9.1	0.0	5.6	17.2
Above Average	31.0	54.5	16.7	55.6	20.7
Well Above Average	3.4	6.1	0.0	0.0	0.0
Missing	6.8	0.0	16.7	5.6	6.9

Table 5.
Income by Zone Upper Pinellas County

Income	Zone				
	Barrier Island (n=39)	Zone A Mainland (n=40)	Zone B (n=46)	Zone C (n=23)	Outside Zone C (n=199)
Well Below Average	0.0	12.5	18.9	0.0	7.0
Below Average	5.1	7.5	3.8	17.4	10.1
Average	12.8	27.5	26.4	8.7	15.1
Above Average	43.6	25.0	30.2	47.8	37.2
Well Above Average	30.8	2.5	3.8	0.0	10.6
Missing	7.7	25.0	17.0	26.0	20.1

Table 6.
Income by Zone Lower Pinellas County

Income	Zone				
	Barrier Island (n=92)	Zone A Mainland (n=102)	Zone B (n=110)	Zone C (n=70)	Outside Zone C (n=290)
Well Below Average	3.3	16.7	40.0	8.6	38.6
Below Average	4.3	4.9	14.5	27.1	15.2
Average	45.7	25.5	15.5	41.4	16.6
Above Average	14.1	8.8	22.7	15.7	16.6
Well Above Average	30.4	31.4	0.9	0.0	7.4
Missing	2.2	12.8	6.3	7.1	5.1

Table 7.
Income by Zone Pasco County

Income	Zone				
	Barrier Island N/A	Zone A Mainland (n=37)	Zone B (n=24)	Zone C (n=36)	Outside Zone C (n=121)
Well Below Average		25.7	37.5	0.0	8.3
Below Average		15.7	4.2	27.8	21.5
Average		0.0	0.0	16.7	12.4
Above Average		1.4	0.0	0.0	0.0
Well Above Average		0.0	0.0	0.0	0.0
Missing		57.1	58.4	55.6	57.9

Table 8.
Percentage of Respondents Evacuating by County and Hurricane Zone (Number in Parentheses Equals Total on Which Percentage is Based)

	County					
Zone	Hills.	Manat.	Up.Pine.	Lo.Pine.	Pasco	Total
Barrier Island	90.5% (n=21)	89.7% (n=29)	94.9% (n=39)	83.7% (n=92)	N/A	87.8% (n=181)
Zone A Mainland	77.6 (n=76)	66.7 (n=33)	60.0 (n=40)	74.3 (n=102)	62.9 (n=70)	70.0 (n=321)
Zone B	68.5 (n=90)	66.7 (n=6)	60.4 (n=53)	50.9 (n=110)	50.0 (n=24)	58.5 (n=283)
Zone C	35.1 (n=77)	33.3 (n=18)	30.4 (n=23)	25.7 (n=70)	22.2 (n=36)	29.6 (n=224)
Outside Zone C	7.2 (n=167)	25.9 (n=58)	21.6 (n=199)	19.3 (n=290)	24.8 (n=121)	18.7 (n=156)

Hurricane Elena have been excluded from this analysis.) In total, almost 90 percent of the barrier island respondents evacuated compared to 70 percent who lived in Zone A on the mainland and 58 percent of the Zone B respondents. The above mentioned groups were those that were under mandatory evacuation. Thirty percent of the Zone C respondents and 19 percent of the residents outside of Zone C evacuated. These latter figures are inflated regarding the actual number of evacuees who should not have evacuated because mobile home residents were included in the sample.

The decline in evacuation rates from the barrier islands to outside Zone C were expected based on previous research (e.g., Hazards Management Group, 1986), and, of course, common sense. In addition, the evacuation rate for Pinellas County barrier island residents (87 percent) is comparable to the 93 percent evacuation rate reported by Baker (1987).

Within the mandatory evacuation areas, Lower Pinellas County had lower evacuation rates both for barrier island respondents and those who lived in Zone B than the other counties. With the exception of Zone A the evacuation patterns in Hillsborough, Manatee, and Upper Pinellas Counties were remarkably similar.

Destinations of the evacuees by zone of residents are listed in Table 9. In general, friends or relatives were the most frequently mentioned destination of all the evacuees. However, fewer barrier island evacuees went to public shelters than did any other group. Interestingly, more than one-fourth of the evacuees from Zone A on the mainland went to public shelters.

Table 9.
Where Evacuees Went by Zone Total Sample

Where	Zone				
	Barrier Island (n=158)	Zone A Mainland (n=220)	Zone B (n=119)	Zone C (n=64)	Outside Zone C (n=146)
Friend/Relative	52.5%	46.2%	58.7%	59.4%	49.3%
Motel/Hotel	16.5	10.9	8.4	12.4	11.6
Public Shelter	17.1	28.1	26.9	21.9	30.8
Other	13.9	14.9	6.0	6.3	8.2

Thus, location of residence appears to influence their evacuation destination.

Indicated in Tables 10-14 are the evacuation destinations of evacuees by county and hurricane zone of residence. Although the cell frequencies in some of the cells were small, in general, the results mirror those of the total sample. The only notable exception to this finding was that almost one-third of the Hillsborough County barrier island residents evacuated to public shelters.

As illustrated in Table 15, the two most frequently mentioned sources of notification to evacuate were television and law enforcement personnel (police, sheriff, and fire employees). Similar percentages of the evacuees in each of the hurricane zones indicated that they were motivated to evacuate by television reports. As was expected, law enforcement officials were mentioned more frequently by evacuees in the mandatory evacuation zones than evacuees in other areas.

Comparing the sources of notification by county (Tables 16-20), two results are noteworthy. First, compared to the other counties, Hillsborough County residents were more frequently notified to leave by law enforcement officials. Second, a higher percentage of Pasco County evacuees from mandatory evacuation zones left because of television reports than because of notification by law enforcement officials. In all other counties, law enforcement officials were more frequently mentioned as the source of notification than television for those evacuees who lived in mandatory evacuation areas.

Table 10.
Where Evacuees Went Hillsborough County by Zone

Where	Zone				
	Barrier Island (n=19)	Zone A Mainland (n=59)	Zone B (n=62)	Zone C (n=28)	Outside Zone C (n=11)
Friend/Relative	42.1%	61.0%	58.1%	60.7%	63.6%
Motel/Hotel	10.5	3.4	6.5	25.0	0.0
Public Shelter	31.6	27.1	30.6	10.7	18.2
Other	15.8	8.5	4.8	3.6	18.2

Table 11.
Where Evacuees Went Manatee County by Zone

Where	Zone				
	Barrier Island (n=26)	Zone A Mainland (n=21)	Zone B (n=4)	Zone C (n=6)	Outside Zone C (n=13)
Friend/Relative	57.7%	23.8%	16.7%	83.3%	23.1%
Motel/Hotel	14.2	28.6	0.0	0.0	23.1
Public Shelter	7.7	19.0	33.3	16.7	38.5
Other	15.4	28.6	16.7	0.0	15.4

Table 12.
Where Evacuees Went Upper Pinellas County by Zone

Where	Zone				
	Barrier Island (n=37)	Zone A Mainland (n=23)	Zone B (n=33)	Zone C (n=6)	Outside Zone C (n=42)
Friend/Relative	51.4%	43.5%	60.6%	83.3%	42.9%
Motel/Hotel	21.6	21.7	9.1	16.7	11.3
Public Shelter	16.2	21.7	21.1	0.0	33.3
Other	10.8	13.0	9.1	0.0	11.9

Table 13.
Where Evacuees Went Lower Pinellas County by Zone

Where	Zone				
	Barrier Island (n=76)	Zone A Mainland (n=75)	Zone B (n=56)	Zone C (n=17)	Outside Zone C (n=54)
Friend/Relative	53.9%	37.3%	60.7%	47.1%	50.0%
Motel/Hotel	14.5	6.7	8.9	0.0	11.1
Public Shelter	17.1	36.0	26.8	41.2	29.6
Other	14.3	20.0	3.6	11.8	9.3

Table 14.
Where Evacuees Went Pasco County by Zone

Where	Zone				
	Barrier Island (N/A)	Zone A Mainland (n=43)	Zone B (n=12)	Zone C (n=7)	Outside Zone C (n=30)
Friend/Relative		53.5%	58.3%	42.9%	56.7%
Motel/Hotel		14.0	16.7	0.0	10.0
Public Shelter		23.3	16.7	42.9	26.7
Other		9.3	8.3	14.3	6.7

Table 15.
Who Notified Evacuees to Leave Total Sample by Zone

Who	Zone				
	Barrier Island (n=155)	Zone A Mainland (n=220)	Zone B (n=167)	Zone C (n=68)	Outside Zone C (n=149)
Emerg. Manage.	1.3%	2.3%	1.2%	0.0%	4.0%
Family Member	3.2	4.1	4.8	1.5	7.4
Friend/Neighbor	7.1	7.3	7.8	8.8	6.0
Television	25.2	28.2	24.0	26.5	30.9
Radio	3.9	1.8	3.0	0.0	1.3
Red Cross	0.0	0.0	0.0	1.5	.7
Law Enforcement	45.2	43.6	44.3	35.3	30.2
Own Decision	10.3	6.8	7.8	14.7	17.5
Other	3.9	5.9	7.2	11.8	2.0

Table 16.
Who Notified Evacuees to Leave Hillsborough County by Zone

Who	Zone				
	Barrier Island (n=19)	Zone A Mainland (n=58)	Zone B (n=62)	Zone C (n=28)	Outside Zone C (n=11)
Emerg. Manage.	5.3%	1.7%	1.6%	0.0%	0.0%
Family Member	0.0	3.4	6.5	3.6	27.3
Friend/Neighbor	10.5	10.3	4.8	7.1	9.1
Television	0.0	19.0	14.5	14.3	27.3
Radio	5.3	3.4	3.2	0.0	0.0
Red Cross	0.0	0.0	0.0	0.0	0.0
Law Enforcement	68.3	58.6	54.8	50.0	27.3
Own Decision	5.5	1.7	9.7	21.4	9.1
Other	5.3	1.7	4.8	3.6	0.0

Table 17.
Who Notified Evacuees to Leave Manatee County by Zone

Who	Zone				
	Barrier Island (n=26)	Zone A Mainland (n=22)	Zone B (n=4)	Zone C (n=7)	Outside Zone C (n=15)
Emerg. Manage.	0.0%	0.0%	0.0%	0.0%	6.7%
Family Member	11.5	0.0	0.0	0.0	0.0
Friend/Neighbor	3.8	4.5	0.0	0.0	0.0
Television	19.2	4.5	0.0	14.3	6.7
Radio	7.7	0.0	0.0	0.0	0.0
Red Cross	0.0	0.0	0.0	14.3	0.0
Law Enforcement	42.3	50.0	75.0	57.1	46.7
Own Decision	15.4	13.6	0.0	0.0	33.3
Other	0.0	27.3	25.0	14.3	0.0

Table 18.
Who Notified Evacuees to Leave Upper Pinellas County by Zone

Who	Zone				
	Barrier Island (n=34)	Zone A Mainland (n=22)	Zone B (n=33)	Zone C (n=8)	Outside Zone C (n=44)
Emerg. Manage.	0.0%	0.0%	3.0%	0.0%	4.5%
Family Member	5.9	0.0	6.1	0.0	9.1
Friend/Neighbor	5.9	13.6	9.1	0.0	6.8
Television	29.4	27.3	21.2	62.5	25.0
Radio	2.9	4.5	3.0	0.0	2.3
Red Cross	0.0	0.0	0.0	0.0	2.3
Law Enforcement	41.2	45.5	48.5	12.5	25.0
Own Decision	8.8	9.1	0.0	0.0	20.5
Other	5.9	0.0	9.1	25.0	4.5

Table 19.
Who Notified Evacuees to Leave Lower Pinellas County by Zone

Who	Zone				
	Barrier Island (n=76)	Zone A Mainland (n=74)	Zone B (n=56)	Zone C (n=18)	Outside Zone C (n=55)
Emerg. Manage.	1.3%	5.4%	0.0%	0.0%	1.8%
Family Member	0.0	6.8	3.6	0.0	3.6
Friend/Neighbor	7.9	4.1	10.7	16.7	5.5
Television	31.6	35.6	33.9	38.9	41.8
Radio	2.6	0.0	0.0	0.0	1.8
Red Cross	0.0	0.0	0.0	0.0	0.0
Law Enforcement	42.1	36.5	32.1	22.2	23.6
Own Decision	10.5	8.1	10.7	5.6	16.4
Other	3.9	4.1	9.0	16.7	5.5

Table 20.
Who Notified Evacuees to Leave Pasco County by Zone

Who	Zone Barrier Island (N/A)	Zone A Mainland (n=44)	Zone B (n=12)	Zone C (n=7)	Outside Zone C (n=29)
Emerg. Manage.		0.0%	0.0%	0.0%	6.9%
Family Member		4.5	0.0	0.0	6.9
Friend/Neighbor		6.8	8.3	14.3	6.9
Television		40.9	41.7	14.3	27.6
Radio		2.3	16.7	0.0	0.0
Red Cross		0.0	0.0	0.0	0.0
Law Enforcement		31.8	25.0	14.3	37.9
Own Decision		6.8	8.3	42.9	6.9
Other		6.8	0.0	14.3	6.9

The reasons given by barrier island residents for not evacuating are listed in Table 21. Almost one-third of the non-evacuees felt that their houses provided adequate shelter and were on high, safe ground; while 18 percent indicated they were simply not inclined to evacuate.

Evacuation Destination by Income

Surprisingly, there was relatively little difference in destination as a function of income (see Table 22). For example, 22 percent of the evacuees with well-above-average incomes compared to 29 percent of the evacuees with well-below-average incomes, evacuated to public shelters.

The destinations of the evacuees as a function of both income and zone of residence are shown in Tables 23-27. Although the number of respondents were small in many cases, these data indicated that the well-above-average evacuees from barrier islands and Zone A on the mainland were slightly less likely than their above-average income counterparts to go to public shelters.

The destinations of evacuees by county and income are listed in Tables 28-32. Above average income evacuees were more likely than average income evacuees to go to public shelters in Lower Pinellas and Manatee Counties while the reverse was true in Upper Pinellas County.

Awareness and Use of Tabloid

The tabloid supplement published by the Tampa Bay Regional Planning Council and distributed in the daily newspapers is assumed to be an important source of public information. To analyze the usefulness of this communication medium, all

Table 21.
Reasons Given by Barrier Island Residents for Not Evacuating

Reason	(n=22)
House Provided Adequate Shelter	31.8%
Did Not Feel Like It	18.2
Storm Not Severe Enough	9.1
Job Required Staying	4.5
Other	13.6
Not Specified	22.7

Table 22.
Where Evacuees Went by Income Total Sample

	Income				
Where	Well Below Average (n=96)	Below Average (n=86)	Average (n=194)	Above Average (n=172)	Well Above Average (n=106)
Friend/Relative	52.1%	47.7%	54.1%	49.4%	53.8%
Motel/Hotel	8.3%	16.3%	10.3%	11.6%	13.2%
Public Shelter	29.2%	25.6%	24.2%	26.7%	21.7%
Other	10.4%	10.5%	11.4%	12.2%	11.3%

Table 23.
Where Evacuees From Barrier Islands Went by Income

	Income				
Where	Well Below Average (n=1)	Below Average (n=10)	Average (n=52)	Above Average (n=50)	Well Above Average (n=39)
Friend/Relative	0.0%	60.0%	51.9%	48.0%	59.0%
Motel/Hotel	0.0	20.0	15.4	12.0	23.0
Public Shelter	0.0	0.0	13.5	24.0	15.4
Other	100.0	20.0	19.2	16.0	2.6

Table 24.
Where Evacuees From Zone A Went by Income

Where	Income: Well Below Average (n=28)	Below Average (n=23)	Average (n=47)	Above Average (n=30)	Well Above Average (n=49)
Friend/Relative	35.7%	43.5%	48.9%	33.3%	51.0%
Motel/Hotel	10.7	17.4	8.5	16.7	6.1
Public Shelter	35.7	30.4	29.8	30.0	24.5
Other	17.9	8.6	12.7	20.0	18.4

Table 25.
Where Evacuees From Zone B Went by Income

Where	Income: Well Below Average (n=36)	Below Average (n=17)	Average (n=42)	Above Average (n=43)	Well Above Average (n=6)
Friend/Relative	58.8%	58.8%	66.7%	55.8%	66.7%
Motel/Hotel	8.3	11.8	2.4	9.3	0.0
Public Shelter	30.6	23.5	28.6	27.9	16.7
Other	2.8	5.9	2.4	7.0	16.7

Table 26.
Where Evacuees From Zone C Went by Income

	Income				
Where	Well Below Average (n=4)	Below Average (n=13)	Average (n=22)	Above Average (n=19)	Well Above Average (n=0)
Friend/Relative	75.0%	30.8%	54.5%	78.9%	
Motel/Hotel	0.0	15.4	13.6	15.8	
Public Shelter	25.0	38.5	27.3	5.3	
Other	0.0	15.4	4.5	0.0	

Table 27.
Where Evacuees From Outside Zone C Went by Income

	Income				
Where	Well Below Average (n=0)	Below Average (n=22)	Average (n=27)	Above Average (n=29)	Well Above Average (n=12)
Friend/Relative		50.0%	48.1%	41.4%	41.7%
Motel/Hotel		13.6	14.8	6.9	16.7
Public Shelter		27.3	22.2	37.9	33.3
Other		9.1	14.8	13.8	8.3

Table 28.
Where Hillsborough County Evacuees Went by Income

	Income				
Where	Well Below Average (n=12)	Below Average (n=12)	Average (n=67)	Above Average (n=50)	Well Above Average (n=43)
Friend/Relative	41.7%	58.3%	65.7%	50.0%	61.5%
Motel/Hotel	0.0	8.3	7.5	14.0	3.8
Public Shelter	41.7	25.0	25.4	24.0	19.2
Other	16.7	8.3	1.5	12.0	15.4

Table 29.
Where Manatee County Evacuees Went by Income

	Income				
Where	Well Below Average (n=3)	Below Average (n=17)	Average (n=22)	Above Average (n=24)	Well Above Average (n=3)
Friend/Relative	33.3%	41.2%	45.5%	37.5%	0.0%
Motel/Hotel	0.0	23.5	27.3	16.7	33.3
Public Shelter	0.0	17.6	13.6	29.2	33.3
Other	66.7	17.6	13.6	16.7	33.3

Table 30.
Where Upper Pinellas County Evacuees Went by Income

	Income				
Where	Well Below Average (n=9)	Below Average (n=12)	Average (n=28)	Above Average (n=50)	Well Above Average (n=18)
Friend/Relative	55.6%	41.7%	53.6%	54.0%	55.6%
Motel/Hotel	0.0	25.0	3.6	14.0	22.2
Public Shelter	44.4	16.7	25.0	18.0	22.2
Other	0.0	16.7	17.8	14.0	0.0

Table 31.
Where Lower Pinellas County Evacuees Went by Income

	Income				
Where	Well Below Average (n=52)	Below Average (n=29)	Average (n=75)	Above Average (n=48)	Well Above Average (n=59)
Friend/Relative	51.9%	48.3%	48.0%	50.0%	52.5%
Motel/Hotel	9.6	10.3	9.3	4.2	13.6
Public Shelter	28.8	37.9	25.3	37.5	22.0
Other	9.6	3.4	17.4	8.3	11.9

Table 32.
Where Pasco County Evacuees Went by Income

	Income				
Where	Well Below Average (n=20)	Below Average (n=16)	Average (n=2)	Above Average (n=0)	Well Above Average (n=0)
Friend/Relative	60.0%	50.0%	0.0%		
Motel/Hotel	15.0	18.8	50.0		
Public Shelter	20.0	18.8	50.0		
Other	5.0	12.6	0.0		

respondents were asked if they were aware of the tabloid, and if they used it during Hurricane Elena. In general, people were aware of the tabloid's existence and in all counties except for Upper Pinellas County, evacuees were more likely to have had knowledge of the tabloid than were non-evacuees (see Table 33). Similiarly, when the sample was divided by hurricane zone of the individual's residence, evacuees were more likely to be aware of the tabloid than were non-evacuees (see Table 34). This finding was especially evident in the hurricane zones under a mandatory evacuation order. Shown in Appendix B is the percentage of respondents who were aware of the tabloid by both county and zone of residence.

Being aware of the existence of the tabloid and actually using it are quite different. As can be seen in Table 35, in Hillsborough, Manatee, and Pasco Counties a substantially higher percentage of evacuees actually used the tabloid than did non-evacuees. In Pinellas County there was virtually no difference in the percentage indicating tabloid use between the two groups. Overall, more than one-half of the evacuees indicated that they used the tabloid. When examining tabloid use by zone of residence, in all zones except for Zone C, evacuees were more likely to have used the tabloid than were non-evacuees (see Table 36). Appendix C presents the percentage of respondents who used the tabloid by county and zone of residence.

Pets

Emergency managers and Red Cross officials have expressed concern about if owning a pet influences evacuation behavior and

Table 33

Percentage of Respondents Who Were Aware of Tabloid by County

County	Evacuees	Nonevacuees
Hillsborough	86.6 (n=179)	76.4 (n=250)
Manatee	81.1 (n=74)	77.9 (n=68)
Upper Pinellas	83.9 (n=143)	86.5 (n=208)
Lower Pinellas	89.0 (n=281)	83.7 (n=375)
Pasco	85.1 (n=94)	81.9 (n=155)

Table 34

Percentage of Respondents Who Were Aware of Tabloid by Zone of Residence

Zone	Evacuees	Nonevacuees
Barrier Island	86.9 (n=160)	81.8 (n=22)
Mainland Zone A	85.6 (n=224)	73.4 (n=94)
Zone B	90.3 (n=165)	84.4 (n=116)
Zone C	84.6 (n=65)	83.4 (n=151)
Outside Zone C	82.8 (n=157)	82.3 (n=673)

Table 35

Percentage of Respondents Who Used Tabloid by County

County	Evacuees	Nonevacuees
Hillsborough	48.0 (n=179)	40.0 (n=250)
Manatee	54.0 (n=74)	36.8 (n=68)
Upper Pinellas	57.3 (n=143)	60.9 (n=210)
Lower Pinellas	55.5 (n=283)	57.6 (n=377)
Pasco	69.1 (n=94)	47.7 (n=155)

Table 36

Percentage of Respondents Who
Used Tabloid by Zone of Residence

Zone	Evacuees	Nonevacuees
Barrier Island	51.2 (n=160)	45.4 (n=22)
Mainland Zone A	51.6 (n=225)	40.4 (n=94)
Zone B	60.6 (n=165)	53.4 (n=116)
Zone C	51.5 (n=66)	52.3 (n=153)
Outside Zone C	62.4 (n=157)	52.4 (n=675)

what evacuees actually do with their pets. This knowledge is especially important because pets are not allowed in public shelters. As can be seen in Table 37, except for Hillsborough County, non-evacuees were more likely to have pets than were evacuees. In examining pet ownership by hurricane zone, no difference was found in pet ownership between evacuees and non-evacuees on the barrier islands. In Mainland Zone A and Zone B, evacuees were more likely to have pets than non-evacuees. Finally, in Zone C and beyond Zone C, the reverse was true; non-evacuees were more likely to have pets.

An issue not previously considered in the literature is what evacuees did with their pets. Although a relatively large number of people did not specify what they did with their pets, one fact is obvious: evacuees either took their pets to a friend or relative or left them at home. In all counties, at least one-fourth of the evacuees left their pets at home (see Table 39). This is a conservative estimate because of the large number of people who failed to indicate what they did with their pets. When examining refuge of pets as a function of zone of residence, similiar results were found (see Table 40).

Re-entry

A major problem facing emergency managers is the problem of re-entry. Naturally, evacuees want to go home to inspect their property and salvage their belongings. On the other hand, emergency managers do not want to allow people back into evacuated areas until it is safe. In an attempt to deal with this issue, evacuees were asked, "On whose authority did you

Table 37

Percentage of Respondents
With Pets by County

County	Evacuees	Nonevacuees
Hillsborough	52.8 (n=178)	43.5 (n=248)
Manatee	30.1 (n=73)	38.2 (n=68)
Upper Pinellas	27.8 (n=140)	32.8 (n=210)
Lower Pinellas	28.6 (n=280)	31.0 (n=374)
Pasco	17.2 (n=93)	29.6 (n=152)

Table 38

Percentage of Respondents
With Pets by Evacuation Zone

Zone	Evacuees	Nonevacuees
Barrier Island	31.9 (n=160)	31.8 (n=22)
Mainland Zone A	35.4 (n=223)	28.7 (n=94)
Zone B	33.7 (n=163)	29.3 (n=116)
Zone C	33.3 (n=63)	37.1 (n=148)
Outside Zone C	28.7 (n=157)	35.8 (n=673)

Table 39

Where Evacuees Took Their Pets by County

	County				
ıere	Hillsborough (n=93)	Manatee (n=29)	Upper Pinellas (n=40)	Lower Pinellas (n=84)	Pasco (n=17)
ɜft Home	36.5%	27.6%	30.0%	30.9%	41.2%
ıblic Shelter	5.4%	3.4%	5.0%	4.8%	5.9%
ıimal Shelter	1.1%	3.4%	2.5%	0.0%	0.0%
riend/Relative	37.6%	27.6%	32.5%	41.7%	41.2%
ther/Not Specified	19.3%	37.9%	30.0%	22.6%	11.8%

Table 40

Where Evacuees Took Their Pets
by Zone of Residence

Where	Barrier Island (n=54)	Mainland Zone A (n=82)	Zone B (n=57)	Zone C (n=24)	Outside Zone C (n=48)
	Zone				
Left Home	29.6%	35.4%	36.8%	16.7%	35.4%
Public Shelter	1.8%	4.9%	8.8%	4.2%	4.2%
Animal Shelter	0.0%	0.0%	3.5%	0.0%	2.1%
Friend/Relative	38.9%	34.1%	40.3%	45.8%	35.4%
Other/Not Specified	29.6%	25.6%	10.5%	33.3%	22.9%

return home?" As can be seen in Table 41, in all counties except Manatee County, the two most important sources of authority were the media and the individual's own decision. In Manatee County, law enforcement officials were frequently mentioned as a source of information to return home. Examining this data as a function of place of residence, the results for all the mainland areas were found to be very similiar. The media and the individual's own decision were the two most important sources. For barrier island residents, law enforcement personnel were the second most important source mentioned after the media. Since in many situations, the bridges to the barrier islands were blocked by law enforcement personnel, this finding is quite reasonable (see Table 42).

Shown in Table 43 is the source of authority as a function of type of refuge. For all types of refuge except public shelters, the media was the most important source of information. Shelter evacuees were most likely to return when told to do so by shelter personnel. However, one-third of the shelter evacuees did return on their own decision.

Conclusions

The analyses based upon the additional data in the data base indicated the following:

1. The percentage of evacuees was a direct function of hurricane zone of residence with the highest evacuation rates being on the barrier islands (90%). However, the evacuation rate for those residents who lived in Zone A on the mainland was only 70 percent.

Table 41

On Whose Authority People Returned Home by County

Authority	County				
	Hillsborough (n=174)	Manatee (n=69)	Upper Pinellas (n=136)	Lower Pinellas (n=267)	Pasco (n=87)
Media	37.4%	24.6%	44.1%	37.8%	55.2%
Shelter	8.0%	7.2%	11.0%	12.4%	16.1%
Law Enforcement	4.6%	23.2%	5.1%	8.6%	1.1%
Own	41.9%	23.2%	25.0%	23.6%	20.7%
Other/Not Specified	8.0%	21.7%	14.7%	17.6%	6.9%

Table 42

On Whose Authority People Returned Home by Zone

here	Zone: Barrier Island (n=154)	Mainland Zone A (n=219)	Zone B (n=155)	Zone C (n=61)	Outside Zone C (n=139)
edia	42.2%	36.5%	44.5%	37.7%	38.8%
helter	8.4%	12.3%	10.4%	13.1%	12.2%
aw Enforcement	18.8%	5.5%	2.6%	6.6%	3.6%
wn	13.6%	30.1%	32.3%	31.1%	31.6%
ther/Not Specified	16.9%	15.5%	10.3%	11.5%	13.7%

Table 43

On Whose Authority People Went Home as a Function of Place of Refuge

Authority	Refuge: Friend/ Relative (n=300)	Motel/ Hotel (n=83)	Public Shelter (n=193)	Other (n=67)
Media	49.0%	54.2%	10.4%	32.8%
Shelter	0.7%	2.4%	40.4%	0.0%
Law Enforcement	9.0%	4.8%	6.7%	14.9%
Own	33.3%	16.9%	33.2%	23.9%
Other/Not Specified	8.0%	21.7%	9.3%	28.4%

Thus, emergency management officials should consider educating these mainland residents regarding their vulnerability to the storm surge in a hurricane.

2. Barrier island evacuees were somewhat less likely to evacuate to public shelters than were any other group. However, more than one-fourth of the Zone A mainland evacuees did so. Thus, place of refuge appears to be related to location of residence of evacuees.
3. Income was not related to place of refuge. Approximately the same percentage of evacuees went to public shelters regardless of their income.
4. Evacuees were more likely to be aware of the tabloid supplement than were non-evacuees and were also more likely to have used it. More than one-half of the evacuees did use the tabloid.
5. A substantial proportion of the evacuees left their pets at home, and most of the others took them to friends or relatives.
6. In general, people returned home because they were informed to do so by the media or made their own decision that it was safe to do so. Barrier island residents, however, frequently mentioned law enforcement personnel as being the source of information.

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Appendix A

Age Group Distribution (%) of Non-Evacuees and Evacuees by Total Sample and Zone

up*	Barrier Is.		Zone A		Zone B		Zone C		Out of Zone	
	Non	Evac	Non	Evac	Non	Evac	Non	Evac	Non	Evac
	0.0	5.0	4.0	5.3	4.3	11.3	4.2	8.5	8.0	5.2
	0.0	5.8	9.8	7.8	5.1	13.9	12.9	9.8	11.0	4.9
	8.7	5.8	8.9	8.7	11.0	12.7	12.4	11.0	11.9	5.2
	10.9	13.6	7.6	8.9	13.3	13.2	10.3	16.5	13.1	10.7
	6.5	8.6	11.1	11.4	7.8	9.4	12.6	10.4	11.2	9.8
	19.6	9.7	15.1	15.0	14.8	11.8	14.0	7.3	12.0	13.1
	32.6	24.5	16.4	19.8	23.0	17.6	19.2	19.5	18.8	24.2
	19.6	19.8	19.6	19.2	14.5	6.8	11.4	14.0	10.2	22.3
	2.2	5.8	6.2	3.0	5.5	2.8	3.0	1.8	3.3	4.6
	0.0	1.1	1.3	0.9	0.8	0.5	0.0	1.2	0.8	0.0
	(n=46)	(n=359)	(n=225)	(n=527)	(n=256)	(n=426)	(n=428)	(n=164)	(n=1781)	(n=327)

roup 1 = Under 10 years
roup 2 = 10 - 19 years
roup 3 = 20 - 29 years
roup 4 = 30 - 39 years
roup 5 = 40 - 49 years
roup 6 = 50 - 59 years
roup 7 = 60 - 69 years
roup 8 = 70 - 79 years
roup 9 = 80 - 89 years
roup 10= 90 - 99 years

Appendix A
Age Group Distribution (%) of Non-Evacuees and Evacuees by Hillsborough County and Zone

roup*	Barrier Is.		Zone A		Zone B		Zone C		Out of Zone	
	Non	Evac	Non	Evac	Non	Evac	Non	Evac	Non	Evac
1	0.0	9.1	11.5	5.7	7.1	12.3	4.7	10.4	11.2	6.7
2	0.0	11.0	9.6	12.1	10.0	17.1	15.5	9.1	10.2	3.3
3	0.0	9.1	25.0	13.4	10.0	15.5	14.7	6.9	9.5	13.3
4	0.0	21.9	7.7	12.7	18.6	19.3	14.0	15.6	12.1	2.0
5	20.0	12.8	15.4	10.2	14.3	7.0	8.5	10.4	18.0	3.3
6	40.0	16.4	17.3	13.4	20.0	11.2	17.1	13.0	13.3	10.0
7	40.0	7.3	7.7	17.8	10.0	12.3	12.4	13.0	16.3	20.0
8	0.0	5.5	1.9	11.5	7.1	2.1	9.3	10.4	7.3	23.3
9	0.0	0.0	1.9	1.9	1.4	2.7	3.9	0.0	1.5	0.0
10	0.0	0.0	1.9	1.3	1.4	0.5	0.0	1.3	0.7	0.0
	(n=5)	(n=55)	(n=52)	(n=157)	(n=70)	(n=187)	(n=130)	(n=77)	(n=457)	(n=30)

Group 1 = Under 10 years
Group 2 = 10 - 19 years
Group 3 = 20 - 29 years
Group 4 = 30 - 39 years
Group 5 = 40 - 49 years
Group 6 = 50 - 59 years
Group 7 = 60 - 69 years
Group 8 = 70 - 79 years
Group 9 = 80 - 89 years
Group 10= 90 - 99 years

Appendix A
Age Group Distribution (%) of Non-Evacuees and Evacuees by Manatee County and Zone

oup*	Barrier Is.		Zone A		Zone B		Zone C		Out of Zone	
	Non	Evac	Non	Evac	Non	Evac	Non	Evac	Non	Evac
1	0.0	0.0	0.0	1.6	0.0	12.5	0.0	0.0	5.6	4.3
2	0.0	3.2	6.5	4.7	0.0	0.0	21.9	0.0	14.6	4.3
3	0.0	3.2	6.5	9.4	0.0	25.0	12.5	6.7	16.9	0.0
4	60.0	9.5	0.0	1.6	0.0	0.0	15.6	40.0	12.4	4.3
5	0.0	4.8	9.7	10.9	0.0	0.0	18.8	6.7	5.6	4.3
6	0.0	7.9	22.6	15.6	0.0	12.5	6.3	13.3	3.4	4.3
7	40.0	23.8	6.5	23.4	0.0	50.0	18.8	33.3	22.5	17.4
8	0.0	28.6	29.0	31.3	100.0	0.0	6.3	0.0	13.5	34.8
9	0.0	7.9	16.1	0.0	0.0	0.0	0.0	0.0	4.5	26.1
0	0.0	1.6	0.0	1.6	0.0	0.0	0.0	0.0	1.1	0.0
	(n=5)	(n=63)	(n=31)	(n=67)	(n=1)	(n=8)	(n=32)	(n=15)	(n=88)	(n=23)

roup 1 = Under 10 years
roup 2 = 10 - 19 years
roup 3 = 20 - 29 years
roup 4 = 30 - 39 years
roup 5 = 40 - 49 years
roup 6 = 50 - 59 years
roup 7 = 60 - 69 years
roup 8 = 70 - 79 years
roup 9 = 80 - 89 years
roup 10= 90 - 99 years

Appendix A
Age Group Distribution (%) of Non-Evacuees and Evacuees by Upper Pinellas County and Zone

roup*	Barrier Is.		Zone A		Zone B		Zone C		Out of Zone	
	Non	Evac	Non	Evac	Non	Evac	Non	Evac	Non	Evac
1	0.0	0.0	0.0	8.3	3.4	12.3	2.3	0.0	6.8	5.3
2	0.0	5.6	9.7	12.5	6.8	9.9	11.6	0.0	11.4	5.3
3	0.0	5.6	0.0	12.5	17.0	16.0	11.6	0.0	12.7	3.2
4	0.0	8.5	9.7	4.2	13.6	13.6	9.3	0.0	12.2	8.5
5	0.0	4.2	9.7	25.0	5.1	6.2	4.7	23.1	13.2	12.8
6	67.0	11.3	0.0	25.0	17.0	12.3	11.6	23.1	15.3	9.6
7	0.0	33.8	19.4	8.3	25.4	16.0	34.9	30.8	13.5	23.4
8	33.0	25.4	35.5	0.0	8.5	8.6	7.0	15.4	11.2	30.9
9	0.0	5.6	16.1	4.2	3.4	3.7	7.0	7.7	2.9	1.1
10	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0	0.8	0.0
	(n=8)	(n=71)	(n=31)	(n=48)	(n=59)	(n=81)	(n=43)	(n=13)	(n=385)	(n=94)

Group 1 = Under 10 years
Group 2 = 10 - 19 years
Group 3 = 20 - 29 years
Group 4 = 30 - 39 years
Group 5 = 40 - 49 years
Group 6 = 50 - 59 years
Group 7 = 60 - 69 years
Group 8 = 70 - 79 years
Group 9 = 80 - 89 years
Group 10= 90 - 99 years

Appendix A
Age Group Distribution (%) of Non-Evacuees and Evacuees by Lower Pinellas County and Zone

up*	Barrier Is.		Zone A		Zone B		Zone C		Out of Zone	
	Non	Evac	Non	Evac	Non	Evac	Non	Evac	Non	Evac
	0.0	6.5	0.0	8.0	3.9	10.7	6.7	10.3	7.1	5.1
	0.0	5.3	15.7	6.8	1.9	10.7	14.1	10.3	10.3	2.0
	12.5	3.5	5.9	6.8	8.7	8.3	12.1	5.1	10.7	5.1
	6.3	16.5	9.8	11.8	11.7	6.6	8.1	17.9	16.2	11.1
	6.3	8.8	13.7	9.3	5.8	13.2	15.4	12.8	8.5	12.1
	15.6	7.6	13.7	13.0	10.7	11.6	13.4	5.1	11.7	23.2
	34.4	26.5	25.5	16.8	25.2	24.0	17.4	23.1	20.0	23.2
	21.9	18.2	11.8	21.1	22.3	11.6	11.4	10.3	10.3	16.2
	3.1	5.3	2.0	5.6	9.7	3.3	1.3	5.1	4.3	2.0
	0.0	1.8	2.0	0.6	0.0	0.0	0.0	0.0	0.9	0.0
	(n=33)	(n=170)	(n=51)	(n=161)	(n=103)	(n=122)	(n=148)	(n=39)	(n=634)	(n=100)

roup 1 = Under 10 years
roup 2 = 10 - 19 years
roup 3 = 20 - 29 years
roup 4 = 30 - 39 years
roup 5 = 40 - 49 years
roup 6 = 50 - 59 years
roup 7 = 60 - 69 years
roup 8 = 70 - 79 years
roup 9 = 80 - 89 years
roup 10= 90 - 99 years

Appendix A
Age Group Distribution (%) of Non-Evacuees and Evacuees by Pasco County and Zone

roup*	Barrier Is.		Zone A		Zone B		Zone C		Out of Zone	
	Non	Evac	Non	Evac	Non	Evac	Non	Evac	Non	Evac
1			5.0	1.1	0.0	3.6	1.3	10.0	5.5	5.0
2			6.7	2.1	0.0	21.4	2.7	0.0	6.9	8.8
3			3.3	2.1	8.7	0.0	9.3	10.0	6.9	6.3
4			8.3	5.3	4.3	3.6	6.7	10.0	9.2	11.3
5			6.7	10.6	4.3	21.4	16.0	0.0	6.9	7.5
6			18.3	13.8	13.0	14.3	14.7	0.0	10.1	7.5
7			20.0	30.9	47.8	21.4	26.7	20.0	35.9	30.0
8			28.3	30.9	13.0	14.3	20.0	45.0	14.3	16.3
9			3.3	2.1	4.3	0.0	2.7	0.0	3.4	7.5
10			0.0	1.1	4.3	0.0	0.0	5.0	0.5	0.0
	(n=0)	(n=0)	(n=60)	(n=94)	(n=23)	(n=28)	(n=75)	(n=20)	(n=217)	(n=80)

Group 1 = Under 10 years
Group 2 = 10 - 19 years
Group 3 = 20 - 29 years
Group 4 = 30 - 39 years
Group 5 = 40 - 49 years
Group 6 = 50 - 59 years
Group 7 = 60 - 69 years
Group 8 = 70 - 79 years
Group 9 = 80 - 89 years
Group 10= 90 - 99 years

Appendix B

Percentage of Respondents Who Were Aware of Tabloid by County and Zone of Residence

Hurricane Zone

ɔunty	Barrier Island	Mainland Zone A	Zone B	Zone C	Outside Zone C
ɪllsborough					
ɣacuees	94.7(n=19)	85.0(n=60)	90.2(n=61)	85.2(n=27)	66.7(n=12)
ɔnevacuees	100.0(n=2)	70.6(n=17)	85.7(n=28)	85.4(n=48)	72.3(n=155)
ɪnatee					
ɣacuees	80.8(n=26)	87.0(n=23)	100.0(n=4)	100.0(n=6)	60.0(n=15)
ɔnevacuees	100.0(n=2)	54.5(n=11)	100.0(n=2)	90.0(n=10)	79.1(n=43)
ɔpper Pinellas					
ɣacuees	76.3(n=38)	87.0(n=23)	87.5(n=32)	85.7(n=7)	86.0(n=43)
ɔnevacuees	66.7(n=3)	66.7(n=15)	85.0(n=20)	87.5(n=16)	88.4(n=154)
ɔwer Pinellas					
ɣacuees	92.2(n=77)	85.1(n=74)	91.1(n=56)	88.2(n=17)	87.7(n=57)
ɔnevacuees	80.0(n=15)	80.0(n=25)	85.2(n=54)	79.6(n=49)	84.9(n=232)
ɜasco					
ɣacuees	-	86.4(n=44)	91.7(n=12)	62.5(n=8)	86.7(n=30)
ɔnevacuees	-	80.8(n=26)	75.0(n=12)	82.1(n=28)	83.1(n=89)

Appendix C

Percentage of Respondents Who Used the Tabloid by County and Zone of Residence

	Hurricane Zone				
County	Barrier Island	Mainland Zone A	Zone B	Zone C	Outside Zone C
Hillsborough					
Evacuees	26.3(n=19)	50.0(n=60)	52.5(n=61)	59.3(n=27)	25.0(n=12)
Nonevacuees	50.0(n=2)	35.3(n=17)	39.3(n=28)	50.0(n=48)	37.4(n=155)
Manatee					
Evacuees	61.5(n=26)	43.5(n=23)	75.0(n=4)	83.3(n=6)	40.0(n=15)
Nonevacuees	50.0(n=2)	18.2(n=11)	0.0(n=2)	40.0(n=10)	41.9(n=43)
Upper Pinellas					
Evacuees	50.0(n=38)	47.8(n=23)	68.8(n=32)	14.3(n=7)	67.4(n=43)
Nonevacuees	0.0(n=3)	40.0(n=15)	60.0(n=20)	75.0(n=16)	62.8(n=156)
Lower Pinellas					
Evacuees	54.5(n=77)	45.3(n=75)	60.7(n=56)	44.4(n=18)	68.4(n=57)
Nonevacuees	53.3(n=15)	52.0(n=25)	61.1(n=54)	54.9(n=51)	58.2(n=232)
Pasco					
Evacuees	-	70.5(n=44)	75.0(n=12)	50.0(n=8)	70.0(n=30)
Nonevacuees	-	42.3(n=26)	50.0(n=12)	42.9(n=28)	50.6(n=89)